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## ABSTRACT

IN APPRAISING THE INDIVIDUALLY PRESCRIBED INSTRUCTION SYSTEM, THREE SOURCES OF INFORMATION WERE UTILIZED: A MAIN INSTRUMENT, THE DEGREE OF IMPLEMENTATION STUDY, AND TWO ADDITIONAL INVESTIGATIONS, THE REPORT OF STUDENT PROGRESS AND THE REPORT OF THE SCHOOL VISITATION MONITORS. TO DETERMINE THE DEGREE OF IMPLEMENTATION, A SAMPLE OF THE STUDENT PLACEMENT PROFILES AND PRESCRIPTIONS WAS ANALYZED WITH REGARD TO THE DIAGNOSTIC INSTRUMENTS AND INSTRUCTIONAL DECISIONS MADE BY TEACHERS. THE REPORT OF STUDENT PROGRESS IS A SUMMARY OF THE INDIVIDUAL STUDENT'S PROGRESS WHICH HAS BEEN PROGRAMED FOR THE COMPUTER. APPENDICES CONTAIN THE STATISTICAL DATA COLLECTED IN THESE STUDIES AND A GUIDE FOR THEIR INTERPRETATION. (JY)

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THE USE OF DATA  
IN  
MONITORING SCHOOL IMPLEMENTATION  
OF  
INDIVIDUALLY PRESCRIBED INSTRUCTION

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE  
OFFICE OF EDUCATION

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EM007 769

In the past many well-publicized educational innovations, after attracting widespread interest, failed when implemented outside their initial setting. A major cause of this poor record of implementation has been an absence of a detailed systematic specification for the control of the operation, coupled with a realistic method for monitoring and changing the implementation once it was operational in a given locale. For the IPI project, the goals and elements are set forth in the training materials, and the task remains one of appraising and, if necessary, improving the degree to which they have been incorporated.

A monitoring and evaluation system has therefore been devised to meet the following purposes:

1. To assist the school personnel in evaluating and improving their program by providing feedback on their use of the system along with ways in which they can improve.
2. To appraise the training materials by determining if the goals and elements of IPI are upheld in the field settings.
3. To provide the Learning Research and Development Center and Research for Better Schools developmental information for refining and improving the IPI system.

Basically, the appraisal system utilizes three sources of information: a main instrument, the Degree of Implementation Study, and two

additional investigations, the Report of Student Progress and the report of the school visitation monitors.

Since IPI provides an operational framework consisting of clearly defined steps and strategies for individualizing instruction, the main study, the Degree of Implementation report, was designed to test how well these operational criteria are met by the teachers. These criteria fall into three major categories: 1) the use of diagnostic instruments, 2) the use of instructional materials and settings, and 3) the use of planning sessions.

To obtain the information needed to make the analysis regarding the use of the diagnostic instruments and of the instructional materials and settings, all profiles (which show the results of the placement testing) and all prescription sheets (which represent the program of studies for each unit) were collected for ten students\* per class for 570 classes. A total of 12,000 prescription sheets were evaluated containing 80,000 mastered skills. After the placement profiles were analyzed manually to determine the percentage of correct administrations, pertinent information from the prescription sheets was coded onto a transfer document, and keypunched. A computer program was written to obtain the numerical data necessary to answer the questions posed for each of the categories.

The first category considered in the report deals with diagnostic instruments. The four diagnostic instruments used in the IPI system (placement, pretests, posttests, and curriculum-embedded tests) provide a continual diagnosis of the pupils' mastery of subject content. In

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\* The pupils selected for the sample were the first five children and the last five children in the class when the names were put in alphabetical order.

evaluating the use of these tests, the required standards of performance were whether or not the tests were given at the correct times and if the established mastery criterion was upheld.

To determine the degree of implementation, the following questions were asked:

1. Do teachers administer the placement tests properly?
2. Do pupils begin work at points in the continuum consistent with placement test results?
3. Is the unit pretest given for each unit begun and are all skills tested?
4. Are Curriculum-Embedded Tests used properly?
5. Are prescriptions written in accord with unit pretest results?
6. Are posttests used properly?

The second category studied was the instructional decisions a teacher makes in forming a program of studies prescription for a student. A diagnosis of the learning needs of the pupils and the objectives to be mastered should result in a variety of materials and settings used. To describe the decisions made for the pupils, reports are generated as follows:

1. For each type of instructional materials and settings used, the percentage was calculated. A student should not always work alone nor should he only learn by completing worksheets.
2. The variability in the number of worksheets which constitute the first prescription for each skill was analyzed. Since pupils should receive prescriptions of differing length, the median, 25th, and 75th percentiles were computed. In addition, the appropriateness of the assignments for a skill and the teacher's ability to predict the pupils' knowledge and under-

standing may be judged by the number of Curriculum-Embedded Tests required for mastery when interpreted in light of the median number of pages. Therefore, the mean number of tests prescribed was calculated.

The initial analysis was completed during October and November of 1968. Each teacher received a report representing her performance based on the data collected. If the degree of implementation for a particular question was below 100%, an example of an error was printed out which included the pupil's number and the unit in which the mistake was found. In this way, the teachers could re-examine the materials to better understand the error. In addition, school and national summaries were compiled.

A second data collection and analysis, taking place in March 1969, has been scheduled to allow time for the school personnel to analyze the results from the Fall Report and to make improvements where necessary.

The results from the National Summary for November, March, and the November-March Comparison along with a complete guide for its interpretation may be found in Tables I-III. (All tables appear in the Appendix.)

The third data source is the planning sessions which play an integral role in IPI by allowing teachers to plan together as an instructional team. Information on the nature and frequency of these meetings in each school aids in the analysis of the problems found in implementing IPI and their solutions, as well as providing data on the type of continuous training occurring in the school. A machine-scannable form was devised to be completed by the planning session leader after each meeting. The forms are forwarded to Research for Better Schools at the end of each month for processing at the end of the school year. A copy of this form can be found in the Appendix.



The next major area of evaluation involves the Report of Student Progress. This report is compiled from a computer data bank file, which was established in September, containing IPI placement information for the 15,191 pupils in the program. At three times during the 1968-69 school year--November, February and May--this file is updated to include placement information for new pupils and progress data for all students. The computer printouts of the updated information in the file are made available as rapidly as possible. These data may be viewed on many levels depending on the orientation of the user, be he teacher, administrator, school monitor, or researcher.

Teachers and school administrators may examine this information to determine the academic progress each pupil has made at different points in time during the school year. In addition, by looking at overall class trends, they can answer the questions "At what rate are pupils progressing through the continuum?", and "How much have the pupils learned?" For example, based on the placement data collected in September, the teachers received information depicting the dispersion of the students within their classes. A typical example of September placement results for one class is presented in Table IV. The National Summary results of September's placement are presented by grade and across grades in Table V.

After the November update, the teachers received complete reports, similar to the abstracted ones found in Tables VI and VII, which showed not only where the pupils were currently working, but also the amount of progress they made in the six weeks since their initial placement. By re-examining the class dispersion in terms of the units in the continuum in

which pupils are currently working and also in the number of skills the pupils have completed, the teacher has concise information about what each child has mastered. This enables her to investigate why certain pupils may have mastered 20-30 skills during the period, while others have only mastered 1-10.

For the research and development groups examining the schools in terms of how well they are implementing the IPI system, the progress the pupils are making in the continuum is of the utmost importance. If the IPI goals of "Every pupil makes regular progress towards mastery of instructional content," and "Every pupil proceeds to mastery of instructional content at his own rate" are being upheld within the field testing sites, then the following should result: 1) Between two points in time, there should be variation in the number of skills mastered across pupils; for example, all pupils should not have mastered five skills. 2) For different periods in time, there should be dispersion in the number of skills mastered for any given pupil. 3) At any given point in time, the pupils in any class should be dispersed along the continuum. These three statements are not necessarily the only way to operationalize the concept of individualization. However, if the pupils in a class do not illustrate these three elements, then individualization is not occurring.

In addition, for developmental purposes, it is also important to trace the progress of all pupils throughout the nation through the IPI continuum. The National Summary in Table VIII showing the pupils' status in November provides this data. Summaries have also been compiled illustrating the number of skills completed by pupils along two dimensions:



1. For November and February the mean number of skills completed since placement by grade and across grades.  
(Tables IX and X.)
2. For November and February, the mean and standard deviation of skills completed in each area by pupil's current status.  
(Table XI.)

The third source of information on the extent to which IPI is being implemented correctly originates from the monitoring and resource team whose members make periodic visits to each of the schools. A written report is thus provided from a direct onsite evaluation by a trained observer.

In addition to collecting data on the elements needed to help the school personnel implement the IPI model, the team actually assists in effecting change by:

1. Aiding in the continuous training of the teachers and administrators.
2. Helping the school personnel adjust to the evolutionary changes in the school climate which are the inevitable results of the installation of IPI. In general, schools appear to follow a path which begins with a concern for system detail and mechanics, proceeds to functional group discussion and planning, and finally leads to a fairly sophisticated level characterized by concern with the theoretical implications and developmental aspects of the program.

3. Providing any other assistance which the school requests in connection with IPI; for example, questions arise concerning the theory of individualization, the rationale behind the curriculum, the need for class scheduling, and the organization of a materials center.

The information from the Degree of Implementation and Report of Student Progress is provided to help the implementation team work with the schools. This team's efforts become imperative in terms of helping the schools use and interpret the large amount of information which is available in improving their operation.

In summary, although the general results as reported in the National Summary of the Degree of Implementation are quite good, the teachers' use of the diagnostic instruments shows the need for improvements; e.g. in the teacher training materials and in the schools' use of the IPI tests.

The Report of Student Progress illustrates that all classes showed a wide dispersion of their entering behavior into the IPI continuum and that variability was present in the number of skills completed by the pupils from placement to November 6.

With these data and the reports from the monitoring teams, the needed feedback has been given to the schools and the research and development teams to effect change. One conclusion to be drawn is that the overall strategy set up by Learning Research and Development Center and Research for Better Schools for diffusing IPI mathematics appears to be effective

**APPENDIX A**

**DEGREE OF IMPLEMENTATION**

**DEGREE OF IMPLEMENTATION RESULTS**  
**GUIDE FOR INTERPRETATION**

The guide for interpreting the results of each question is as follows:

1. Do teachers administer the placement tests properly?

Since placement tests are used to enter a student into the mathematics continuum and serve as the starting point for finer, more discriminating diagnosis, it is very important that they be given correctly. To assess the degree to which the children in each class were properly placement tested, profiles were checked with respect to the correct test given according to the following criteria:

A. In a given unit, e.g. C-Num, if a child scored

- (1) 0 - 20, he should have been given the B-Num test;
- (2) 21 - 79, he should be placed in C-Num;
- (3) 80 -100, he should have been given the D-Num test.

For each time the rule is violated, a count of minus one point is given.

This is Type 1 error.

B. According to the basic rules of placement testing, if a child needs to take any test in Level C, he should also take C-Combination of Processes; if a child needs to take any test in Level D, he should also take D-Multiplication and D-Division.

If C-COP should have been given and was not given, this counts as half an error.

If D-Multiplication and/or D-Division should have been given and were not given, this counts as half an error.

This is Type 2 error.

- C. If the children are given the correct test but placement is wrong, this counts as half an error per area.

This is a Type 3 error.

If the number of error points accumulated on a profile is two or higher, this profile is counted as a reject.

2. Do pupils begin work at points in the continuum consistent with placement test results?

Since the units are carefully sequenced, the mastery of each unit is generally dependent upon mastery of the preceding unit.

The placement tests determine the units to be studied and the continuum specifies the sequence of the units to be mastered. Therefore, the student should work in the necessary units in the order in which they are sequenced in the continuum.

Utilizing the placement information and prescriptions which were sent to RBS, a comparison was made to determine if the pupils started in the continuum correctly.

3. Is the unit pretest given for each unit begun?

With the exception of Level A, unit pretests are available and should be administered for all skills. The results are then used to analyze the specific mathematics skills the student has yet to master within a particular unit.

An error occurs if the pretest is not administered or if a partial pretest is given.

4. Are prescriptions written in accordance with unit pretest results?

Prescriptions should be written for all skills with pretest scores below mastery (84% or less), unless teacher judgment is indicated. For this question a "prescription" is defined as the assignment of materials, settings, or a Curriculum-Embedded Test.

5. Are prescriptions different for different pupils working in the same skill?

In IPI, instructional decisions are choices a teacher makes in forming a unique program of studies for a student. A diagnosis of the learning needs of the pupils and the objectives to be mastered should result in a variety of materials and settings used.

To describe the decisions made for the pupils, the following reports were generated:

Instructional Techniques (IT):

IPI offers a framework within which to individualize instruction and some prepared materials to help in the task. However, since the Standard Teaching Sequence (STS) pages are not sufficient for individualizing instruction, the IPI teacher needs to utilize a variety of settings and materials.

Each prescription written consists of a combination of the two types of instructional techniques: settings and materials. A short description of these techniques follows:

SETTINGS

ALONE: if a pupil works in materials, but does not have any of the following settings, he is said to work by himself.

- 01 Teacher Tutor: A child has been tutored when the teacher aids him in explaining, questioning, creating a worksheet, etc. This does not include the reading of directions.
- 02 Peer Tutor: Another student assists this student with a particular skill.
- 03 Small Group Instruction: Two to ten students are brought together for instruction on a particular skill.
- 04 Large Group Instruction: Eleven or more students are brought together for instruction on a particular skill.
- 05 Seminar: Large group instruction on more than one skill is the focus of the instruction. An example might be a discussion of the use of time applying all the skills from a particular level.



- 07 Independent Study: A student is working independently searching for information on a problem. This setting does not refer to a pupil working alone in the Standard Teaching Sequence, but may often be used alone with Research (10).
- 11 Tutor of Others: This student is used to tutor another student. If this student is receiving the tutoring then it should be recorded as 02.

#### MATERIALS

STS: The pupil worked in one or more pages in the Standard Teaching Sequence.

- 06 Curriculum Texts: This includes the use of any textbook which is used for the teaching of a particular skill.
- 08 Film Strips: This would include the use of any film or filmstrips.
- 09 Records/Tapes: This would include the use of any records, tapes or other audio devices that are used to teach a particular skill.
- 10 Research: The pupil uses books and/or other materials to learn a skill or group of skills. This work may go beyond simple mastery to include the use of the skill in problem solving.
- 12 Manipulative Devices: A child is assigned a manipulative device which aids the teaching of a particular skill.

#### Variability of Prescriptions:

After analyzing the pretest scores and selecting the first skill needing work, the decision is made regarding the instructional settings and materials which will constitute the "first prescription". If STS pages are prescribed the total number of pages should vary among pupils working on the same and different skills.

To determine this, the following information is included in the report:

- a. **MEDIAN NUMBER OF PAGES:** The number of pages prescribed such that 50% of the pupils were prescribed more pages and 50% of the pupils prescribed fewer pages.

For example, if the median is 6, it means that half of the prescriptions were for more than 6 pages and half were for less than 6 pages.

- b. **25% OF THE CASES ARE BELOW \_\_\_\_:** 25% of the 1st prescriptions included fewer than this number of pages.

For example, if 25% of the cases are below 4, it means that 25% of the prescriptions were for less than 4 pages.

- c. **25% OF THE CASES ARE ABOVE \_\_\_\_:** The number of pages prescribed such that 25% of the first prescriptions included more pages.

For example, if 25% of the cases are above 9, it means that one-fourth of the first prescriptions were for greater than 9 pages.

Another way to determine the variability of prescriptions is to examine the average number of CETs to mastery. Since all pupils working in a skill complete at least one CET, the average number to mastery should be between one and two. If the average number of CETs is greater than two, the causes may be:

1. The teacher consistently does not look carefully at workpage scores so that she can predict when the pupils are ready for CETs.
2. The teacher has adopted a pattern of prescribing a few pages and then a test, a few pages and then a test, for all pupils regardless of their present scores and her knowledge of their abilities.
3. The teacher assigns CETs before workpages to nearly all pupils and not just to ones with borderline pretest scores or score conflicts. (See explanation of question 5 for definition of score conflicts.)
4. The teacher unnecessarily requires the pupil to master two successive CETs before accepting that the pupil has mastered the skill.

If the average number of CETs is very close to 1.00 and the median number of pages in the first prescription is very high (perhaps 8 to 10 or more), this may indicate another problem. In such cases, nearly all the pupils pass the first CET, but many of them may be receiving unnecessarily long prescriptions.

6. Are Curriculum-Embedded Tests used properly?

To monitor the student's progress as he works on his prescription and moves from skill to skill within a unit, CETs should be administered. This diagnostic instrument has two parts and should be utilized as follows:

Part I: A CET should be given after a child completes work (pages or IT) in a skill. If he does not show mastery on this CET (a score of 84% or less), follow-up work should be assigned and the alternate form of the CET given. Pupils should not be given a second CET if the first is mastered.

A child may be given a CET without a preceding work assignment if his pretest score was on the borderline of mastery. Again this CET should be followed up with work and/or another CET only if it is failed.

Part II: Since this is a limited pretest of the next skill, mastery or lack of mastery adds information for decision making in two ways:

1. If the score on this part conflicts with the pretest score, the pupil's knowledge should be verified by giving the whole CET for that skill. A transfer of information (and sometimes confusion) between skills often results in a disagreement or conflict between the pupil's pretest score on a skill and his corresponding CET Part II score. Such conflicts should be followed up by a prescription of CET Part I. An error occurs when CET Part II causes a conflict and is not followed by CET Part I of the next skill.
2. Since the pupil should be given every opportunity to test out of a skill, the possibility of transfer between skills needs to be recognized. Therefore, for example, if a pupil works on B-Add-3, then skips to B-Add-6, he should take the CET Part II for B-Add-5 as a short pretest for B-Add-6.

7. Are posttests used properly?

To determine mastery of the unit skills after instruction is given, the posttest should be administered. Since posttest scores below mastery (84% or less) indicate a lack of unit mastery, instruction on the deficient skills must be prescribed as a follow-up.

TABLE I

DEGREE OF IMPLEMENTATION

OF

INDIVIDUALLY PRESCRIBED INSTRUCTION

NATIONAL SUMMARY REPORT

FALL 1968

RESEARCH FOR BETTER SCHOOLS, INC.  
SUITE 1700-1700 MARKET STREET  
PHILADELPHIA, PENNSYLVANIA 19103

NATIONAL SUMMARY REPORT-ALL SCHOOLS

TABLE I

FALL 1968

1A. DO TEACHERS ADMINISTER THE PLACEMENT TESTS PROPERLY ?

NUMBER OF PROFILES: 6772

NUMBER CORRECT: 5569

PERCENTAGE OF ACCURACY: 82%

S

1B. DO PUPILS BEGIN WORK AT POINTS IN THE CONTINUUM CONSISTENT WITH PLACEMENT TEST RESULTS ?

NUMBER OF PROFILES: 3986

NUMBER OF ACCURATE STARTS: 3529

PERCENTAGE OF ACCURACY: 88%

\*COMPUTED ONLY IN THE FALL



TABLE I (CONTD.)

NATIONAL SUMMARY REPORT-ALL SCHOOLS

FALL 1968

2. IS THE UNIT PRETEST GIVEN FOR EACH UNIT BEGUN?

TOTAL NUMBER OF UNITS BEGUN	15234
NUMBER OF SKILLS FOR WHICH ALL SKILLS WERE PRETESTED	14619
PERCENTAGE OF ACCURACY	96%

3. ARE PRESCRIPTIONS WRITTEN IN ACCORD WITH UNIT PRETEST RESULTS?

NUMBER OF SKILLS BELOW 85% ON PRETEST	27772
NUMBER OF SKILLS IN WHICH CHILDREN WORKED BEFORE TAKING THE POSTTEST	25463
PERCENTAGE OF ACCURACY	92%

\*COMPUTED IN THE FALL

TABLE I (CONTD.)  
NATIONAL SUMMARY REPORT-ALL SCHOOLS  
FALL 1968

4. ARE PRESCRIPTIONS DIFFERENT FOR DIFFERENT PUPILS?

A. INSTRUCTIONAL TECHNIQUES - SETTINGS

<u>TECHNIQUE</u>	<u>FREQUENCY</u>	<u>% USAGE</u>
ALONE	18532	75%
01	3781	15%
02	311	1%
03	353	1%
04	173	1%
05	799	3%
07	1025	4%
11	38	0%
<hr/>		
TOTAL	25012	100%

B. INSTRUCTIONAL TECHNIQUES - MATERIALS

<u>TECHNIQUE</u>	<u>FREQUENCY</u>	<u>% USAGE</u>
STS	27149	97%
06	183	1%
08	24	0%
09	36	0%
10	5	0%
12	540	2%
<hr/>		
TOTAL	27937	100%

C. VARIABILITY OF PRESCRIPTIONS

(1) PAGES IN FIRST PRESCRIPTION

MEDIAN NUMBER OF PAGES	4.88
25% OF THE CASES ARE BELOW	3.65
25% OF THE CASES ARE ABOVE	6.68

\*COMPUTED  
IN THE FALL

(2) AVERAGE NUMBER OF CETS TO MASTERY	1.31
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TABLE I (CONTD.)  
NATIONAL SUMMARY REPORT-ALL SCHOOLS  
FALL 1968

5. ARE CURRICULUM-EMBEDDED TESTS USED PROPERLY?

A. IF A CET IS FAILED, IS THERE A FOLLOW-UP?

NUMBER OF CETS FAILED	6765
NUMBER OF FOLLOW-UPS OF FAILED CETS	5882
PERCENTAGE OF ACCURATE FOLLOW-UPS	87%

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B. IF A CET IS PASSED, IS THERE A FOLLOW-UP?

NUMBER OF CETS PASSED	22547
NUMBER OF FOLLOW-UPS OF PASSED CETS	3014
PERCENTAGE OF UNNECESSARY FOLLOW-UPS	9%

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C. IS PART 2 OF THE CET USED FOR DIAGNOSIS?

(1) WHEN A CONFLICT IS INDICATED BETWEEN THE  
PRETEST SCORE AND THE PART 2 SCORE

NUMBER OF CONFLICTS	7220
NUMBER OF TIMES CET IS PRESCRIBED FIRST	3637
PERCENTAGE OF TIMES CET IS PRESCRIBED FIRST	50%

(2) WHEN PRETEST SHOWS SKILLS CAN BE SKIPPED

NUMBER OF OCCURENCES	3937
NUMBER OF TIMES PART 2 IS PRESCRIBED FIRST	173

PERCENTAGE OF TIMES PART 2 IS PRESCRIBED FIRST	4%
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(3) AVERAGE OF (1) AND (2)	34%
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\*COMPUTED IN THE FALL

TABLE I (CONTD.)  
NATIONAL SUMMARY REPORT-ALL SCHOOLS  
FALL 1968

6. ARE POSTTESTS USED PROPERLY?

IF A CHILD FAILS THE POSTTEST, IS THERE A FOLLOW-UP?

NUMBER OF SKILLS FAILED ON THE FIRST POSTTEST	8393
NUMBER OF FOLLOW-UPS	6009
PERCENTAGE OF ACCURATE FOLLOW-UPS	72%

\*COMPUTED IN THE FALL

Student _____ (person filling out this form)		
AGLEIDA		
Is a prepared student?	yes	no
If yes, made by (mark more than one if applicable)		
Principal		
Coordinator		
Teacher		
Other (specify): _____		
PLEASE ATTACH A COPY OF THE ACADEMIC		
ACHIEVEMENT RECORDS (DAILY, WEEKLY, AND		
MONTHLY) TO ONE (if applicable)		
Teacher		
Group of student		
Review of IPI in oral and written		
Summary (minimum of page)		
Student		
Mathematics		
Reading		
Other (specify): _____		
Evaluation of each sample of student		
Evaluation for comparison of different levels of achievement		
Classroom management (if required for		
intervention of children)		
Other (specify): _____		
Other (specify on the other side		
of this form)		

TABLE II

DEGREE OF IMPLEMENTATION  
OF  
INDIVIDUALLY PRESCRIBED INSTRUCTION

NATIONAL SUMMARY REPORT  
SPRING 1969

RESEARCH FOR BETTER SCHOOLS, INC.  
SUITE 1700-1700 MARKET STREET  
PHILADELPHIA, PENNSYLVANIA 19103



TABLE II (CONTD.)  
NATIONAL SUMMARY REPORT-ALL SCHOOLS

2. IS THE UNIT PRETEST GIVEN FOR EACH UNIT BEGUN?

TOTAL NUMBER OF UNITS BEGUN	9038
NUMBER OF UNITS FOR WHICH ALL SKILLS WERE PRETESTED	8683
PERCENTAGE OF ACCURACY	96%

3. ARE PRESCRIPTIONS WRITTEN IN ACCORD WITH UNIT PRETEST RESULTS?

NUMBER OF SKILLS BELOW 85% ON PRETEST	17212
NUMBER OF SKILLS IN WHICH CHILDREN WORKED BEFORE TAKING THE POSTTEST	16132
PERCENTAGE OF ACCURACY	94%

TABLE II (CONTD.)  
NATIONAL SUMMARY REPORT-ALL SCHOOLS

4. ARE PRESCRIPTIONS DIFFERENT FOR DIFFERENT PUPILS WORKING IN THE SAME SKILL?

A. INSTRUCTIONAL TECHNIQUES - SETTINGS

TECHNIQUE	FREQUENCY	% USAGE
ALONE	10307	72%
01	2394	17%
02	339	2%
03	192	1%
04	120	1%
05	518	4%
07	415	3%
11	40	0%
TOTAL	14325	100%

B. INSTRUCTIONAL TECHNIQUES - MATERIALS

TECHNIQUE	FREQUENCY	% USAGE
STS	13352	96%
06	146	1%
08	19	0%
09	24	0%
10	20	0%
12	465	3%
TOTAL	14026	100%

C. VARIABILITY OF PRESCRIPTIONS

(1) PAGES IN FIRST PRESCRIPTION

MEDIAN NUMBER OF PAGES	4.16
25% OF THE CASES ARE BELOW	3.03
25% OF THE CASES ARE ABOVE	5.48

(2) AVERAGE NUMBER OF CETS TO MASTERY 1.31

TABLE II (CONTD.)

NATIONAL SUMMARY REPORT-ALL SCHOOLS

5. ARE CURRICULUM-EMBEDDED TESTS USED PROPERLY?

A. IF A CET IS FAILED, IS THERE A FOLLOW-UP?

NUMBER OF CETS FAILED	4258
NUMBER OF FOLLOW-UPS OF FAILED TESTS	3800
PERCENTAGE OF ACCURATE FOLLOW-UPS	89%

B. IF A CET IS PASSED, IS THERE A FOLLOW-UP?

NUMBER OF CETS PASSED	13404
NUMBER OF FOLLOW-UPS OF PASSED CETS	888
PERCENTAGE OF UNNECESSARY FOLLOW-UPS	7%

C. IS PART 2 OF THE CET USED FOR DIAGNOSIS?

(1) WHEN A CONFLICT IS INDICATED BETWEEN  
THE PRETEST SCORE AND THE PART-2 SCORE

NUMBER OF CONFLICTS	4955
NUMBER OF TIMES CET IS PRESCRIBED FIRST	2912
PERCENTAGE OF TIMES CET IS PRESCRIBED FIRST	59%

(2) WHEN PRETEST SHOWS SKILLS CAN BE SKIPPED

NUMBER OF OCCURENCES	2595
NUMBER OF TIMES PART 2 IS PRESCRIBED FIRST	385
PERCENTAGE OF TIMES PART 2 IS PRESCRIBED	15%

(3) AVERAGE OF (1) AND (2) 44%

TABLE II (CONTD.)  
NATIONAL SUMMARY REPORT-ALL SCHOOLS

6. ARE POSTTESTS USED PROPERLY?

IF A CHILD FAILS THE POSTTEST, IS THERE A FOLLOW-UP?

NUMBER OF SKILLS FAILED ON THE FIRST POSTTEST	4960
NUMBER OF FOLLOW-UPS	4224
PERCENTAGE OF ACCURATE FOLLOW-UPS	85%

TABLE III

DEGREE OF IMPLEMENTATION  
OF  
INDIVIDUALLY PRESCRIBED INSTRUCTION

NATIONAL SUMMARY REPORT  
FALL-SPRING COMPARISON  
1968-1969

RESEARCH FOR BETTER SCHOOLS, INC.  
SUITE 1700-1700 MARKET STREET  
PHILADELPHIA, PENNSYLVANIA 19103

TABLE III (CONTD.)  
NATIONAL SUMMARY REPORT-ALL SCHOOLS

1A. DO TEACHERS ADMINISTER THE PLACEMENT TESTS PROPERLY?

FALL RESULTS\*: 82%

1B. DO PUPILS BEGIN WORK AT POINTS IN THE CONTINUUM CONSISTENT  
WITH PLACEMENT TEST RESULTS?

FALL RESULTS\*: 88%

\*COMPUTED ONLY FOR FALL REPORT.



TABLE III (CONTD.)  
NATIONAL SUMMARY REPORT-ALL SCHOOLS

2. IS THE UNIT PRETEST GIVEN FOR EACH UNIT BEGUN?

FALL RESULTS	96%
SPRING RESULTS	96%
DIFFERENCE	0

3. ARE PRESCRIPTIONS WRITTEN IN ACCORD WITH UNIT PRETEST RESULTS?

FALL RESULTS	92%
SPRING RESULTS	94%
DIFFERENCE	+

\* COMPUTED FOR FALL REPORT ONLY.

TABLE III (CONTD.)

NATIONAL SUMMARY REPORT-ALL SCHOOLS

4. ARE PRESCRIPTIONS DIFFERENT FOR DIFFERENT PUPILS WORKING IN THE SAME SKILL?

A. INSTRUCTIONAL TECHNIQUES - SETTINGS

<u>TECHNIQUE</u>	<u>FALL RESULTS</u>	<u>SPRING RESULTS</u>	<u>DIFFERENCE</u>
ALONE	75%	72%	-
01	15%	17%	+
02	1%	2%	+
03	1%	1%	0
04	1%	1%	0
05	3%	4%	0
07	4%	3%	-
11	0%	0%	0

B. INSTRUCTIONAL TECHNIQUES - MATERIALS

<u>TECHNIQUE</u>	<u>FALL RESULTS</u>	<u>SPRING RESULTS</u>	<u>DIFFERENCE</u>
STS	97%	96%	-
06	1%	1%	0
08	0%	0%	0
09	0%	0%	0
10	0%	0%	0
12	2%	3%	+

C. VARIABILITY OF PRESCRIPTIONS

(1) PAGES IN FIRST PRESCRIPTION

	<u>FALL RESULTS</u>	<u>SPRING RESULTS</u>	<u>DIFFERENCE</u>
MEDIAN NUMBER OF PAGES	4.88	4.16	-
25% OF THE CASES ARE BELOW	3.65	3.03	-
25% OF THE CASES ARE ABOVE	6.68	5.48	-

(2) AVERAGE NUMBER OF CETS TO MASTERY

<u>FALL RESULTS</u>	<u>SPRING RESULTS</u>	<u>DIFFERENCE</u>
1.31	1.31	0

TABLE III (CONTD.)  
NATIONAL SUMMARY REPORT-ALL SCHOOLS

5. ARE CURRICULUM-EMBEDDED TESTS USED PROPERLY?

A. IF A CET IS FAILED, IS THERE A FOLLOW-UP?

FALL RESULTS	87%
SPRING RESULTS	84%
DIFFERENCE	+

---

B. IF A CET IS PASSED, IS THERE A FOLLOW-UP?

FALL RESULTS	9%
SPRING RESULTS	7%
DIFFERENCE	-

---

C. IS PART 2 OF THE CET USED FOR DIAGNOSIS?

(1) WHEN A CONFLICT IS INDICATED BETWEEN THE PRETEST  
SCORE AND THE PART 2 SCORE

FALL RESULTS	50%
SPRING RESULTS	59%
DIFFERENCE	+

(2) WHEN A PRETEST SHOWS SKILLS CAN BE SKIPPED

FALL RESULTS	4%
SPRING RESULTS	15%
DIFFERENCE	+

(3) AVERAGE OF (1) AND (2)

FALL RESULTS	34%
SPRING RESULTS	44%
DIFFERENCE	+

TABLE III (CONTD.)  
NATIONAL SUMMARY REPORT-ALL SCHOOLS

6. ARE POSTTESTS USED PROPERLY?

IF A CHILD FAILS THE POSTTEST, IS THERE A FOLLOW-UP?

FALL RESULTS: 72%

SPRING RESULTS 85%

DIFFERENCE +

**APPENDIX B**

**REPORT OF STUDENT PROGRESS**



LEVEL	NUM	P.V.	ADD	SUB	MULT	DIV	C.O.P.	FRAC	MONEY	TIME	S.O.M	GEOM
	FREQ PRCNT	FREQ PRCNT	FREQ PRCNT	FREQ PRCNT	FREQ PRCNT	FREQ PRCNT	FREQ PRCNT	FREQ PRCNT	FREQ PRCNT	FREQ PRCNT	FREQ PRCNT	FREQ PRCNT
A	1261 11	0 0	1162 7	0 0	0 0	0 0	0 0	1476 9	0 0	0 0	1 0	1 0
B	2702 17	5887 36	1549 9	0 0	0 0	1 0	1 0	3189 19	4548 30	5142 31	6542 40	3190 19
C	4548 28	2373 15	4381 27	7452 46	0 0	0 0	9658 59	7535 46	3111 19	5544 34	3310 20	3665 22
D	4929 30	3832 23	2921 18	4657 28	10306 63	12088 74	3631 22	2103 13	5529 34	2965 18	4615 28	6803 42
E	1491 9	3074 19	2736 17	2286 14	4434 27	2634 16	2081 13	1488 9	1534 9	1343 8	1270 8	1975 12
F	682 4	590 4	1934 12	1108 7	1437 9	1440 9	481 3	474 3	1227 7	1151 7	550 3	670 4
G	134 1	386 2	1434 9	810 5	148 1	187 1	462 3	91 1	12 0	217 1	75 0	59 0
H	16 0	221 1	246 2	40 0	39 0	13 0	49 0	7 0	2 0	1 0	0 0	0 0
							N=16363					

LEVEL	NUM	P.V.	ADD	SUB	MULT	DIV	C.O.P.	FRAC	ADNEY	TIME	S.O.M	GEOM
	FREQ PRCNT	FREQ PRCNT	FREQ PRCNT	FREQ PRCNT	FREQ PRCNT	FREQ PRCNT	FREQ PRCNT	FREQ PRCNT	FREQ PRCNT	FREQ PRCNT	FREQ PRCNT	FREQ PRCNT
A	1012 62	0 0	608 37	0 0	0 0	0 0	0 0	495 30	0 0	0 0	0 0	0 0
B	522 32	1585 97	414 25	0 0	0 0	0 0	1 0	632 39	1442 88	1344 82	1610 99	776 48
C	99 6	47 3	604 37	1631 100	0 0	0 0	1616 99	503 31	162 10	289 18	22 1	580 36
D	0 0	1 0	7 0	2 0	1562 96	1560 96	15 1	3 0	29 2	0 0	1 0	276 17
E	0 0	0 0	0 0	0 0	0 0	0 0	1 0	0 0	0 0	0 0	0 0	1 0
F	0 0	0 0	0 0	0 0	71 4	72 4	0 0	0 0	0 0	0 0	0 0	0 0
G	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0
H	0 0	0 0	0 0	0 0	0 0	1 0	0 0	0 0	0 0	0 0	0 0	0 0
						N= 1633						





[illegible]

## TABLE V -D

GRADE 4.

(COUNTRY / GRADE)

REPORT FROM  
RESEARCH FOR BETTER SCHOOLS  
121 S BROAD ST  
PHILADELPHIA, PA 19102

[illegible]





BLDG. NO.

GRADE 6 COUNTRY/GRADE

TABLE V -F

REPORT FROM  
RESEARCH FOR BETTER S  
121 S BROAD  
PHILADELPHIA,

SECTION DATE 9/30/68

C.C.P. FRAC MONEY TIME S.O.M GEOM

LEVEL	NUM	FREQ PRCNT	P.V.	FREQ PRCNT	ADD	FREQ PRCNT	SUB	FREQ PRCNT	MULT	DIV	FREQ PRCNT	C.C.P.	FRAC	MONEY	TIME	S.O.M	GEOM
A	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
B	38	2	78	4	7	0	0	0	0	0	0	0	104	218	78	72	30
C	222	12	110	6	99	5	116	6	0	0	0	377	452	115	310	247	195
D	631	34	378	20	99	5	351	19	270	14	526	433	404	548	430	709	580
E	595	32	774	41	391	21	581	31	949	51	700	609	672	441	434	522	719
F	205	16	220	12	573	31	429	23	573	31	570	217	204	552	522	288	329
G	59	4	200	11	586	31	378	20	66	4	72	214	31	2	102	38	23
H	2	0	116	6	121	6	21	1	18	1	8	26	2	0	0	0	0
N= 1876																	

[illegible]

[illegible]

	NUM	P.V.	ADD	SUB	MULT	DIV	C.O.P.	F.R.A.C.	MONEY	TIME	S.O.M	G.E.O.M	S.
LEVEL	FREQ PRCNT	FREQ PRCNT	FREQ PRCNT	FREQ PRCNT	FREQ PRCNT	FREQ PRCNT	FREQ PRCNT	FREQ PRCNT	FREQ PRCNT	FREQ PRCNT	FREQ PRCNT	FREQ PRCNT	FREQ PRCNT
A	8 3	0 0	2 1	0 0	0 0	0 0	0 0	25 10	0 0	0 0	1 0	1 0	0
B	69 28	117 48	36 15	0 0	0 0	1 0	0 0	51 21	118 48	102 41	124 50	81 33	0
C	69 28	32 13	77 31	103 42	0 0	0 0	157 64	87 35	27 11	58 24	33 13	57 23	0
D	51 21	49 20	31 13	59 24	133 54	147 60	41 17	31 13	50 20	37 15	47 19	60 24	0
E	23 9	19 8	27 11	28 11	54 22	37 15	16 7	16 7	26 11	14 6	22 9	27 11	0
F	23 9	8 3	38 15	21 9	43 17	40 16	13 5	23 9	25 10	33 13	16 7	11 4	0
G	3 1	12 5	22 9	35 14	10 4	20 8	15 6	12 5	0 0	2 1	3 1	9 4	0
H	0 0	9 4	13 5	0 0	6 2	1 0	4 2	1 0	0 0	0 0	0 0	0 0	0
					NF	246							



[illegible]

BLDG. NO. 00001

GRADE 4

SECTION 10

DATE 11-6-68

Report from  
Research for Better Schools  
121 S. Broad St.  
Philadelphia, Pa.

PUPIL NAME	NUM		PV		ADD		SUB		MULT		DIV		COP		FRAC		M		T		SOM		G		ST		TOTAL SKILL CO.								
	LV	SK	CP	SK	CP	LV	SK	CP	LV	SK	CP	LV	SK	CP	LV	SK	CP	LV	SK	CP	LV	SK	CP	LV	SK	CP									
1	E	06	06E	PO	07	H	PL	00	G	PL	00	F	PL	00	E	PO	06	F	PL	00	F	PL	00	D	PO	05	E	PL	00	D	PO	04	34		
2	E	PO	13E	PL	00	G	PL	00	G	PL	00	E	PL	00	E	PL	00	E	PL	00	D	PO	10	D	PO	05	D	PO	03	D	PO	04	35		
3	F	PL	00F	PL	00	G	PL	00	E	PO	03	E	PL	00	E	PL	00	F	PL	00	F	PL	00	E	PL	00	D	PO	00	E	PL	00	D	PO	10
4	D	PL	00D	PL	00	F	PL	00	C	PL	00	D	PL	00	D	PO	04	D	PL	00	C	PL	00	B	PO	04	D	PL	00	CPL	00	8			
27	E	PO	13E	PR	10	D	PO	13	E	PL	00	E	PL	00	E	PL	00	E	PO	03	F	PL	00	D	PO	05	E	PL	00	D	PO	04	59		

Mathematics Areas

- NUM - Numeration
- PV - Place Value
- ADD - Addition
- SUB - Subtraction
- MULT - Multiplication
- DIV - Division
- COP - Combination of Processes
- FRA - Fractions
- MON - Money
- TIM - Time
- SOM - Systems of Measurement
- GEO - Geometry
- ST - Special Topics

Abbreviations

- LV - Level (A - H)
- SK - Skill or Present Status
- CP - Number of Skills Completed
- PL - Placement
- PR - Pretest
- PO - Posttest

KEY

TABLE VII

### SUMMARY OF SKILLS COMPLETED

## PLACEMENT TO NOVEMBER 6, 1968

**Bldg. No.: 00001**

**Grade: 4**

Section: 10

**Date: 11-6-68**

<b>NUMBER OF SKILLS COMPLETED</b>	<b><u>For Pupils Currently Working in Level</u></b>			
	<b>B</b>	<b>C</b>	<b>D</b>	<b>E</b>
<b>Q3 - Percentile 75</b>	<b>3.10</b>	<b>3.39</b>	<b>5.50</b>	<b>6.10</b>
<b>Q2 - Percentile 50</b>	<b>2.70</b>	<b>2.84</b>	<b>4.07</b>	<b>5.20</b>
<b>Q1 - Percentile 25</b>	<b>1.50</b>	<b>1.93</b>	<b>3.60</b>	<b>3.10</b>
<b>Mean</b>	<b>2.38</b>	<b>3.23</b>	<b>4.83</b>	<b>5.57</b>
<b>Standard Deviation</b>	<b>.93</b>	<b>2.28</b>	<b>2.53</b>	<b>3.21</b>
<b>N Pupil Units*</b>	<b>8</b>	<b>35</b>	<b>40</b>	<b>7</b>

**TOTAL SKILLS COMPLETED: 465**

\*One count for each unit; that is a pupil working in B-NUM and B-PV will receive two Level B counts.

TABLE VIII:

**NUMBER OF PUPILS  
BY PRESENT LEVEL  
BY AREA  
NOVEMBER 1968**

-51-

**NATIONAL SUMMARY**

Counts only include pupils who have mastered one or more skills in area since placement.

**ALL GRADES**

	NUM	PV	ADD	SUB	MUL	DIV	COP	FRA	MON	TIM	SOM	GEO	ST
A	661		207					277					
B	1785	1283	535					648	463	748	929	269	
C	2340	1182	945	523			1213	2260	654	1306	1034	461	
D	2559	1393	345	747	256	548	843	1354	566	620	782	440	1630
E	1350	649	240	387	476	323	343	385	172	190	276	252	526
F	239	125	65	62	173	132	40	117	78	62	47	62	75
G	69	27	57	68	34	21	27	14		32	25	7	20
H		16	15	3	12	4	4	1					

**GRADE 1**

	NUM	PV	ADD	SUB	MUL	DIV	COP	FRA	MON	TIM	SOM	GEO	ST
A	427		142					74					
B	622	93	63					26	15	11	15	2	
C	35	11	114	1			3	14	6	27	11	83	

**GRADE 2**

	NUM	PV	ADD	SUB	MUL	DIV	COP	FRA	MON	TIM	SOM	GEO	ST
A	72		21					110					
B	621	553	278					175	170	270	332	95	
C	626	311	238	84			88	172	105	164	184	80	
D	83	43	19	26	1		20	10	11	8	7	20	15
E	1				5	2						1	

TABLE VIII (CONTD.)

GRADE 3

	NUM	PV	ADD	SUB	MUL	DIV	COP	FRA	MON	TIM	SOM	GEO	ST
A	8		3					38					
B	189	278	80					191	138	251	275	86	
C	745	370	238	199			359	583	184	358	228	93	
D	426	196	90	117	19	34	64	80	39	64	37	30	143
E	28	16	8	5	6	5	6	2	3	2	2	2	2
F		1	1			1			1	1			

GRADE 4

	NUM	PV	ADD	SUB	MUL	DIV	COP	FRA	MON	TIM	SOM	GEO	ST
A	23		1					7					
B	63	104	28					91	42	78	101	32	
C	377	187	126	106			289	627	153	308	259	86	
D	762	393	118	256	72	153	205	377	151	195	182	99	432
E	200	131	70	83	57	50	62	44	36	37	26	26	52
F	9	9	4	5	5	4	1	4	5	5		1	1
G	1		3		1								

GRADE 5

	NUM	PV	ADD	SUB	MUL	DIV	COP	FRA	MON	TIM	SOM	GEO	ST
A	1							2					
B	17	35	5					39	14	28	31	15	
C	165	84	62	57			192	440	114	202	159	48	
D	625	357	61	178	94	178	226	419	132	120	209	103	394
E	329	150	60	84	125	71	63	76	44	48	51	56	111
F	24	25	19	10	20	14	4	8	7	5	5	1	5
G	1	2	10	10			1			1		1	
H			1		1		2						

TABLE VIII (CONTD.)

GRADE 6

	NUM	PV	ADD	SUB	MUL	DIV	COP	FRA	MON	TIM	SOM	GEO	ST
B	5	13	4					18	5	11	11	5	
C	76	38	37	25			119	123	17	67	54	24	
D	283	149	20	91	47	121	165	292	148	110	208	84	469
E	510	233	62	139	196	129	129	177	51	63	116	94	247
F	110	48	12	23	70	57	10	39	27	11	14	18	30
G	16	2	10	11	6	4	2	2		9	3	1	4
H		1	3	1			1						

GRADE 7

	NUM	PV	ADD	SUB	MUL	DIV	COP	FRA	MON	TIM	SOM	GEO	ST
B	1							1	1	1			
C	3						3	6		6	4	1	
D	22	9	3	6	3	10	11	15	10	8	12	4	40
E	42	17	3	10	21	19	18	25	9	7	15	16	62
F	27	7	8	4	29	16	4	15	6	8	7	13	10
G	17	3	8	9	7	3	3	3		6	7	2	9
H		5	4	2	5	3							

GRADE 8

	NUM	PV	ADD	SUB	MUL	DIV	COP	FRA	MON	TIM	SOM	GEO	ST
B										1			
C	1	3	2					4			2	1	
D	5	6		2	2	1	7	4	2	3	5	3	5
E	18	8	5	9	14	6	8	11	3	3	18	17	16
F	19	6	6	6	16	22	10	29	12	21	12	18	22
G	20	18	22	28	14	11	20	8		10	12	2	6
H		8	5		1	1							

TABLE VIII (CONTD.)  
SPECIAL EDUCATION

	NUM	PV	ADD	SUB	MUL	DIV	COP	FRA	MON	TIM	SOM	GEO	ST
A	4		1					16					
B	55	45	5					14	16	15	22	6	
C	22	27	14	9			14	19	6	17	14	5	
D	25	24	1	5		4	15	18	9	15	13	13	10
E	26	15	6	7	8	8	8	9	2	5	10	6	6
F	8	7	1	1	7	2	2	6	3	4	4	4	2
G	6			1	1	2				3	2		
H							1						

OTHER

	NUM	PV	ADD	SUB	MUL	DIV	COP	FRA	MON	TIM	SOM	GEO	ST
A	126		39					30					
B	212	162	72					93	62	82	142	28	
C	290	151	114	42			146	272	69	155	120	41	
D	320	210	32	63	15	43	112	138	58	89	99	60	105
E	189	76	26	49	43	32	44	38	21	24	36	32	29
F	40	21	14	13	24	16	9	16	16	6	5	7	4
G	8	2	4	9	4	1	1	1		2	1		1
H		2	2		5			1					

TABLE IX

REPORT OF STUDENT PROGRESS  
NOVEMBER 1968

S K I L L S C O M P L E T E D

GRADE	NUMBER OF PUPILS	MEAN SKILLS
ALL	13344	16.25
1	1337	10.04
2	2038	12.56
3	2150	14.23
4	2106	18.34
5	1698	20.08
6	1547	20.25
7	125	23.03
8	46	29.43
OTHER	2066	16.57
SP.ED.	231	20.55



TABLE X

REPORT OF STUDENT PROGRESS  
FEBRUARY 1969

S K I L L S C O M P L E T E D

GRADE	NUMBER OF PUPILS	MEAN SKILLS
ALL	15517	39.10
1	1450	24.48
2	2189	30.31
3	2335	33.62
4	2466	40.38
5	2028	48.78
6	1859	51.50
7	227	68.58
8	80	76.54
OTHER	2700	37.69
SP. ED.	183	47.54

TABLE XI

REPORT OF STUDENT PROGRESS  
NUMBER OF SKILLS COMPLETED  
ALL GRADES

NUMERATION						PLACE VALUE						
NOVEMBER			FEBRUARY			NOVEMBER			FEBRUARY			
N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	
A	706	8.31	3.07	359	9.72	2.86						
B	1916	9.65	4.23	1998	13.95	5.58	1416	2.83	.44	1592	2.89	.39
C	2434	7.78	3.95	3141	11.27	5.50	1249	5.09	1.74	2601	5.86	1.97
D	2527	5.88	3.70	4423	8.48	5.04	1371	7.82	2.58	3307	9.07	3.20
E	1277	8.38	3.57	2910	10.40	4.34	632	8.50	3.85	1958	10.48	4.43
F	218	5.66	3.85	837	9.53	5.44	104	8.16	4.23	601	10.63	5.36
G	35	8.37	3.99	181	9.41	4.65	9	4.00	1.50	105	6.44	6.06
H				7	11.57	4.16	3	2.00	0.00	33	2.64	2.40

ADDITION						SUBTRACTION						
NOVEMBER			FEBRUARY			NOVEMBER			FEBRUARY			
N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	
A	213	2.76	.62	442	2.88	.43						
B	550	5.71	3.21	1158	7.11	3.20						
C	1176	7.06	3.79	2618	7.32	3.96	537	3.65	.83	1949	3.74	.73
D	343	6.94	2.79	1451	8.43	3.52	723	4.62	1.56	2367	4.91	1.68
E	228	7.47	3.74	913	8.51	4.11	359	3.87	1.86	1353	4.61	2.26
F	61	6.23	7.46	355	6.54	6.34	94	2.30	1.61	415	3.05	2.26
G	27	5.11	7.70	180	4.32	5.31	33	2.82	2.29	207	2.77	1.99
H	6	9.83	9.22	37	3.95	3.48	2	2.00	1.41	12	4.25	3.80

TABLE XI  
(contd.)

MULTIPLICATION							DIVISION					
NOVEMBER				FEBRUARY			NOVEMBER			FEBRUARY		
N	$\bar{X}$	SD		N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD
A												
B												
C												
D	256	7.64	1.16	877	7.72	1.04	531	6.29	1.59	1655	6.43	1.47
E	442	8.70	3.23	1470	9.87	3.56	295	6.58	2.67	1220	7.25	2.73
F	149	9.65	4.46	613	12.48	5.23	107	6.98	3.37	490	8.49	3.49
G	15	10.13	4.94	134	12.09	6.07	8	8.63	4.93	106	8.41	3.84
H	7	31.57	4.28	22	13.64	8.50				12	9.67	8.34

COMBINATION OF PROCESSES							FRACTIONS					
NOVEMBER				FEBRUARY			NOVEMBER			FEBRUARY		
N	$\bar{X}$	SD		N	$\bar{X}$	SD	N	$\bar{X}$	SD	$\bar{X}$	SD	
A							297	2.72	.63	583	2.84	.51
B							710	2.28	.81	1047	2.67	1.11
C	1241	5.40	1.25	2351	5.66	1.00	2309	3.83	1.14	3576	4.15	1.28
D	827	5.92	2.41	2416	6.55	2.60	1318	5.74	2.26	3172	6.63	2.37
E	300	6.45	2.82	1377	9.90	3.32	362	6.75	2.95	1330	7.90	3.25
F	30	6.47	3.45	235	8.11	4.46	87	9.07	5.39	370	12.13	5.14
G	6	10.83	9.24	83	6.53	4.78	5	18.20	10.52	44	13.68	7.89
H	4	7.75	5.51	14	11.93	9.54	1	34.00		9	16.89	10.25

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TABLE XI  
(contd.)

MONEY						TIME						
NOVEMBER			FEBRUARY			NOVEMBER			FEBRUARY			
N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	
A												
B	490	3.81	.62	852	3.90	.52	806	2.97	.20	1109	2.98	.15
C	699	4.30	1.33	1775	4.58	1.53	1361	2.47	1.02	2914	2.74	1.19
D	533	5.54	1.89	1840	6.13	2.08	587	7.22	4.01	2231	7.94	4.04
E	133	5.91	2.81	772	6.07	2.81	160	9.93	3.82	835	11.42	4.09
F	61	10.30	7.23	646	12.45	6.62	36	9.89	6.48	215	10.13	6.15
G							20	19.70	11.07	76	10.83	10.03
SYSTEMS OF MEASUREMENT						GEOMETRY						
NOVEMBER			FEBRUARY			NOVEMBER			FEBRUARY			
N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	
A												
B	1005	3.84	.58	1547	3.92	.44	296	1.99	.08	548	2.00	.04
C	1075	3.66	1.30	2641	4.15	1.61	503	2.11	.48	1254	2.26	.69
D	720	4.35	1.65	2595	4.85	1.93	412	2.70	.67	1561	2.90	.85
E	241	5.71	2.91	914	7.07	2.87	203	5.60	3.16	1024	6.01	3.30
F	34	6.21	3.93	189	6.71	3.87	34	8.74	3.33	200	10.69	4.05
G	8	8.25	6.99	67	5.28	4.68	3	15.33	9.25	36	15.25	8.19
H									3	23.00	5.20	

TABLE XI  
(contd.)

REPORT OF STUDENT PROGRESS  
NUMBER OF SKILLS COMPLETED

KEY

N = Number of Pupils working in that Unit.

Total population in November was 13,344 pupils.  
Total population in February was 15,517 pupils.

$\bar{X}$  = Mean

SD = Standard Deviation

For example:

1. For example in November: the 706 pupils who worked in A-NUM completed an average of 8.31 skills with a standard deviation of 3.07 in Numeration.
2. The 5 pupils who worked in F-Fractions completed an average of 18.20 skills with a standard deviation of 10.52 in Fractions.